IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| Applicant : | David D. Koester et al. | Appeal No. _____ |
| Serial No.: | 09/751,669 | |
| Filed : | December 29, 2000 | Group Art Unit: 2652 |
| For : | MACHINING ACTUATOR PERIPHERY TO REDUCE RESONANCE VARIATION | Examiner: Tianjie Chen |
| Docket No.: | S01.12-0697/STL 9565 | |

# FOURTH APPEAL BRIEF FOR APPELLANT (THIRD SUPPLEMENTAL BRIEF)

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I HEREBY CERTIFY THAT THIS PAPER IS BEING SENT BY U.S. MAIL, FIRST CLASS, TO THE COMMISSIONER OF PATENTS AND TRADEMARKS, WASHINGTON, D.C. 20231, THIS

19 DAY OF January, 20 06

PATENT ATTORNEY

Sir:

This is an appeal from a rejection of the claims in an Office Action dated October 19, 2005, which re-opened prosecution for the third time following three earlier appeal briefs. This Fourth Appeal Brief is being submitted with a third request for reinstatement of the appeal under M.P.E.P. §1207.04.

## REAL PARTY IN INTEREST

Seagate Technology LLC, a corporation organized under the laws of the State of Delaware, and having offices at 920 Disc Drive, Scotts Valley, CA 95067, has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefore, as set forth in the Assignment filed with the Patent Application and recorded on Reel 011615/Frame 0445.

## RELATED APPEALS AND INTERFERENCES

Applicants are aware of no related appeals or interferences.

## STATUS OF THE CLAIMS

| Claims | Status |
|---|---|
| 1-12 | Withdrawn |
| 14-16 | Canceled |
| 13, 17, 18 | Rejected |
| 19-21 | Allowed |

## STATUS OF AMENDMENTS

An Amendment-After-Final was filed March 14, 2003, which was entered.

## SUMMARY OF CLAIMED SUBJECT MATTER

I. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 13 is directed to a disc drive (e.g., 100) comprising an actuator (e.g., 116, shown in FIGS. 1-3, 5) with a machined external peripheral surface (e.g., 142, 144, 146, 148, 150, 152, 154, 156, 158, and 160) extending along an entire periphery of the actuator (e.g., 116). (Page 7, line 21 to page 8, line 4, page 9, lines 9-11). The actuator (116) comprises a desired profile dimension (e.g., 502, shown in FIG. 5) entirely defined by the machined external peripheral surface (e.g., 142, 144, 146, 148, 150, 152, 154, 156, 158, and 160). (Page 10, line 11 to page 11, line 17).

Dependent claim 17 depends from claim 13 and defines that the machined external peripheral surface has a tolerance of less than 0.010 inches relative to the desired profile dimension (e.g., 502). Dependent claim 18 further defines the tolerance as 0.005 inches or less.

II. THE PRESENT DISCLOSURE

The present disclosure relates to reducing resonance vibration of an actuator in a data storage system. (Page 1, lines 10-12).

The typical processes of casting and extruding actuators inherently have profile tolerances that result in

significant variation in arm resonance from actuator to actuator. (Page 3, lines 4-19).

Figures 2 and 3 (Exhibit A) are perspective views of an actuator 116 according to an illustrative embodiment of the present invention. (Page 6, line 24 to page 7, line 16).

Surfaces 130, 132 and 134 (Figure 2), along with all other surfaces so oriented, are referred to as top surfaces. Surfaces 136, 138 and 140 (Figure 3), as well as all other surfaces facing in the same direction, are referred to as bottom surfaces. All external surfaces of actuator 116 that are not substantially parallel to top surfaces 130, 132 and 134 and bottom surfaces 136, 138 and 140 are thus referred to as peripheral surfaces. In Figures 2 and 3, such peripheral surfaces include surfaces 142, 144, 146, 148, 150, 152, 154, 156, 158 and 160. (Page 6, line 17 to page 7, line 4).

FIG. 4 (Exhibit A) is a flow chart representing a method of manufacturing a disc drive actuator 116 according to an illustrative embodiment of the present invention. At step 404, the peripheral surface (surfaces 142, 144, 146, 148, 150, 152, 154, 156, 158 and 160 in Figures 2 and 3) of the actuator is machined to a desired final profile dimension. In one embodiment, substantially the entire periphery of actuator 116 is machined to the desired final profile dimension. The profile dimension is defined as the dimension perpendicular to the surface when viewed from above or below. (Page 9, lines 3-15).

FIG. 5 (Exhibit A) is a top view of actuator 116. Dashed line 500 shows the profile dimension of the peripheral surface after the extrusion or casting. Solid line 502 shows the desired profile of the peripheral surface. Profile dimension 502 is achieved by machining the surface. (Page 10, lines 4-23).

Machining the periphery allows the surface to be manufactured to a lower tolerance than if the surface is simply extruded or molded without machining the surface. The precise

profile dimension of the surface can be achieved with greater accuracy and greater certainty. When manufacturing a group of similar actuators, there will be less variance in the profile dimensions from one actuator to the next. This results in a reduced degree of variance in the resonance characteristics from one actuator to the next. (Page 9, line 16 to page 10, line 3).

**GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

1. Rejection of claim 13 under 35 U.S.C. § 102(e) based on Williams et al. U.S. Patent No. 6,538,853 (Exhibit B).

2. Rejection of claim 13 under 35 U.S.C. § 102(e) based on Wood et al. U.S. Patent No. 6,038,105 (Exhibit C).

3. Rejection of claim 13 under 35 U.S.C. § 102(b) based on Born et al. U.S. Patent No. 5,930,581 (Exhibit D).

4. Rejection of claim 13 under 35 U.S.C. § 102(e) based on Hyde U.S. Patent No. 5,894,382 (Exhibit E).

5. Rejection of claims 17-18 under 35 U.S.C. § 103(a) based on Williams et al./Wood et al./Born et al./Hyde in view of Brar at al. U.S. Patent 5,156,919 (Exhibit F).

**ARGUMENT**

I. THE REJECTION OF CLAIM 13 UNDER 102(e) BASED ON WILLIAMS ET AL. SHOULD BE REVERSED

Claim 13 was rejected under §102(e) as being anticipated by Williams et al., U.S. Patent No. 6,538,853 (Exhibit B).

Claim 13 is directed to a disc drive comprising:

> "an actuator with a machined external peripheral surface extending along an entire periphery of the actuator and comprising a desired profile dimension entirely defined by the machined external peripheral surface."

A. **A "Machined External Surface" Must be Given Patentable Weight.**

Claim 13 requires the actuator to have a "machined external peripheral surface." The Office Action incorrectly

suggests that the term "machined" is a process limitation. Therefore, no weight was given to this term when determining patentability of the claim.

As described in the previously-filed Declaration of David D. Koester (Exhibit G), this phrase is a structural element within the context of the claim since a "machined external peripheral surface" has a surface finish that can clearly be identified by inspection of the surface and its properties. For example, a visual inspection would easily distinguish a cast or extruded surface from a machined surface. A machined surface has a regular pattern of micro-grooves or scratches that are associated with the rotary or linear movement of the cutting features of the machining tool. A cast or extruded surface has a dull, smooth surface finish that is substantially devoid of similar patterns of micro-grooves or scratches.

The term "machined" is an adjective that modifies the noun "surface". The adjective "machined" in the phrase, "machined external peripheral surface" therefore refers to a definite structural element of the surface, which is easily identifiable by a person of ordinary skill in the art through inspection of the surface.

A "machined external surface" is therefore a property of the product. This phrase adds a definite structural limitation to claim 1 that bears patentable weight within the claim.

B. **Williams Does Not Anticipate Claim 13**

Williams et al. merely state that "the E-block 16 could be extruded and machined to proper dimensions. Alternately, the E-block 16 could be injection molded or cast." (Col. 10, lines 31-34).

This statement simply identifies a typical structure of an E-block. As described on page 3, lines 4-19 of the present application, actuators are usually manufactured by casting or extrusion processes. The casting process involves placing a

castable substance in a mold or form and allowing it to solidify. Extrusion involves forcing a semisoft solid material, such as metal, through the orifice of a die to form a continuously formed piece in the desired shape of the actuator. Typically the resulting length of material is then cut into individual longitudinal sections, each corresponding to a single actuator. The placement of each cut thus defines the top of one actuator (on one side of the cut) and the bottom of another actuator (on the other side of the cut). Thus, the cross-sectional shape of the actuators, as viewed from above or below, is defined by the extrusion process.

As further discussed on page 8, line 20-25 of the present application, "the length of extruded material is illustratively also further cut or machined, at step 402, to achieve the desired shape of the actuator, as is known in the art. For example, extraneous material above and below voice coil support 128 is cut or machined away. Similarly, material above, below and between actuator arms 114 is cut or machined away." (Emphasis added).

Williams et al. simply reflect this traditional method of making an E-block, whereby the part is extruded or cast and then machined to define elements of the E-block. This is what a person of ordinary skill in the art would understand when reviewing the Williams et al. patent.

Nowhere does Williams et al. teach or suggest that E-block has a machined external peripheral surface extending along an entire periphery of the actuator and comprising a desired profile dimension entirely defined by the machined external peripheral surface.

For a prior art reference to anticipate in terms of 35 U.S.C. 102, every element of the claimed invention must be identically shown in a single reference. *In re Bond*, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990) (emphasis added). A

simple mention of machining is not sufficient to anticipate an entire profile dimension being defined by a machined external surface.

Since Williams et al. do not show identically each and every element of claim 13, Applicants respectfully request that the rejection of claim 13 under §102(e) be reversed.

II. THE REJECTION OF CLAIM 13 UNDER 102(e) BASED ON WOOD ET AL. SHOULD BE REVERSED

Claim 13 was rejected under §102(e) as being anticipated by Wood et al., U.S. Patent No. 6,038,105 (Exhibit C).

A. **The Office Action Mischaracterizes Wood et al.**

With regard to claim 13, the Office Action inaccurately states that, "Wood et al. shows an actuator 115, with machined external peripheral surface extending along an entire periphery of the actuator and including a desired profile dimension entirely defined by the machined external peripheral surface (Fig. 2; column 4, lines 53-54)."

Wood et al. does not disclose this element. The citation referred to by the Examiner simply states that the "E-block 115 is typically precision machined from a lightweight material such as aluminum or magnesium to form central bore 138 as well as the plurality of actuator arms 116." (Emphasis added).

This statement simply identifies a typical structure of an E-block as described above, which is usually manufactured by casting or extrusion processes and then cut into individual longitudinal sections. For example, material above, below and between actuator arms is cut or machined away.

The cited sentence in Wood et al. simply reflects this traditional method of making an E-block, whereby the part is extruded or cast and then machined to define elements of the E-block. However, the profile dimension, when viewed from above or below (the external peripheral surface) remains defined by the casting or extrusion process. This is what a person of ordinary

skill in the art would understand when reviewing the Wood et al. patent.

Nowhere does Wood et al. teach or suggest that E-block has a machined external peripheral surface extending along an entire periphery of the actuator and comprising a desired profile dimension entirely defined by the machined external peripheral surface. Therefore, the above-statement in the Office Action regarding the Wood et al. disclosure is not supported by the reference and is inaccurate.

Since Wood et al. do not anticipate, identically, each and every element of claim 13, Applicants respectfully request that the rejection of claim 13 under §102(e) be reversed.

III. THE REJECTION OF CLAIM 13 UNDER 102(e) BASED ON BORN ET AL. SHOULD BE REVERSED

Claim 13 was rejected under §102(b) as being anticipated by Born et al., U.S. Patent No. 5,930,581 (Exhibit D).

A. **Born et al.**

In column 9, lines 33-55, Born describes that the E-block is formed by a tape-casting formulation and is ground and machined to individual E-block actuator support geometeries.

Born do not disclose that the external periphery is machined, as opposed to simply removing excess material between the arms, etc. Even further, Born do not disclose that a machined external peripheral surface extends along an entire periphery of the actuator.

Since Born et al. do not anticipate, identically, each and every element of claim 13, Applicants respectfully request that the rejection of claim 13 under §102(e) be reversed.

IV. THE REJECTION OF CLAIM 13 UNDER 102(e) BASED ON HYDE ET AL. SHOULD BE REVERSED

Claim 13 was rejected under §102(e) as being anticipated by Hyde, U.S. Patent No. 5,894,382 (Exhibit E).

A. **Hyde**

In column 5, lines 2-9, Hyde describes that, "The E-block 61 is typically machined from a single piece of a rigid, lightweight metal such as aluminum."

Again, a person of ordinary skill in the art would understand this statement to mean the ordinary process in which features of the E-block are machined, such as bores or the spaces between the individual arms. A person of ordinary skill in the art would not understand this statement to mean that the entire peripheral dimension is defined by a machined external surface.

Hyde does not disclose that the external periphery is machined, as opposed to simply removing excess material between the arms, etc. Even further, Hyde does not disclose that a machined external peripheral surface extends along an entire periphery of the actuator.

Since Hyde does not anticipate, identically, each and every element of claim 13, Applicants respectfully request that the rejection of claim 13 under §102(e) be reversed.

V. THE REJECTION OF CLAIMS 17 AND 18 UNDER §103(a) SHOULD BE REVERSED

Claims 17 and 18 were rejected under §103(a) as being unpatentable over Williams et al./Wood et al./Born et al./Hyde in view of Brar et al., U.S. Patent No. 5,156,919 (Exhibit F).

Claims 17 and 18 are dependent claims that depend from independent claim 13. Claims 17 and 18 specify tolerances of the machined external peripheral surface relative to the desired profile dimension.

The Office Action states that Williams et al./Wood et al./Born et al./Hyde are silent on the tolerance of the dimension of the surface but suggests this tolerance would be obvious in view of Brar et al.

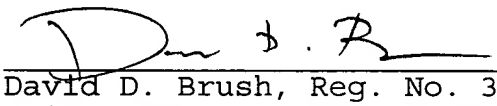
However, as discussed above, Williams et al./Wood et al./Born et al./Hyde fail to teach or suggest a machined external surface extending along an entire periphery of an actuator.

Therefore even if the teachings of Brar et al. were combined with those of Williams et al./Wood et al./Born et al./Hyde, the resulting combination would still fail to teach or suggest all of the elements of dependent claims 17 and 18, including the elements of independent claim 13. Accordingly, Applicants respectfully request that the rejection of claims 17 and 18 under §103(a) be reversed.

**CONCLUSION**

Applicants respectfully request that the Board reverse the Examiner and find that claims 13 and 17-18 are in condition for allowance.

WESTMAN, CHAMPLIN & KELLY, P.A.

By: 

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DDB:

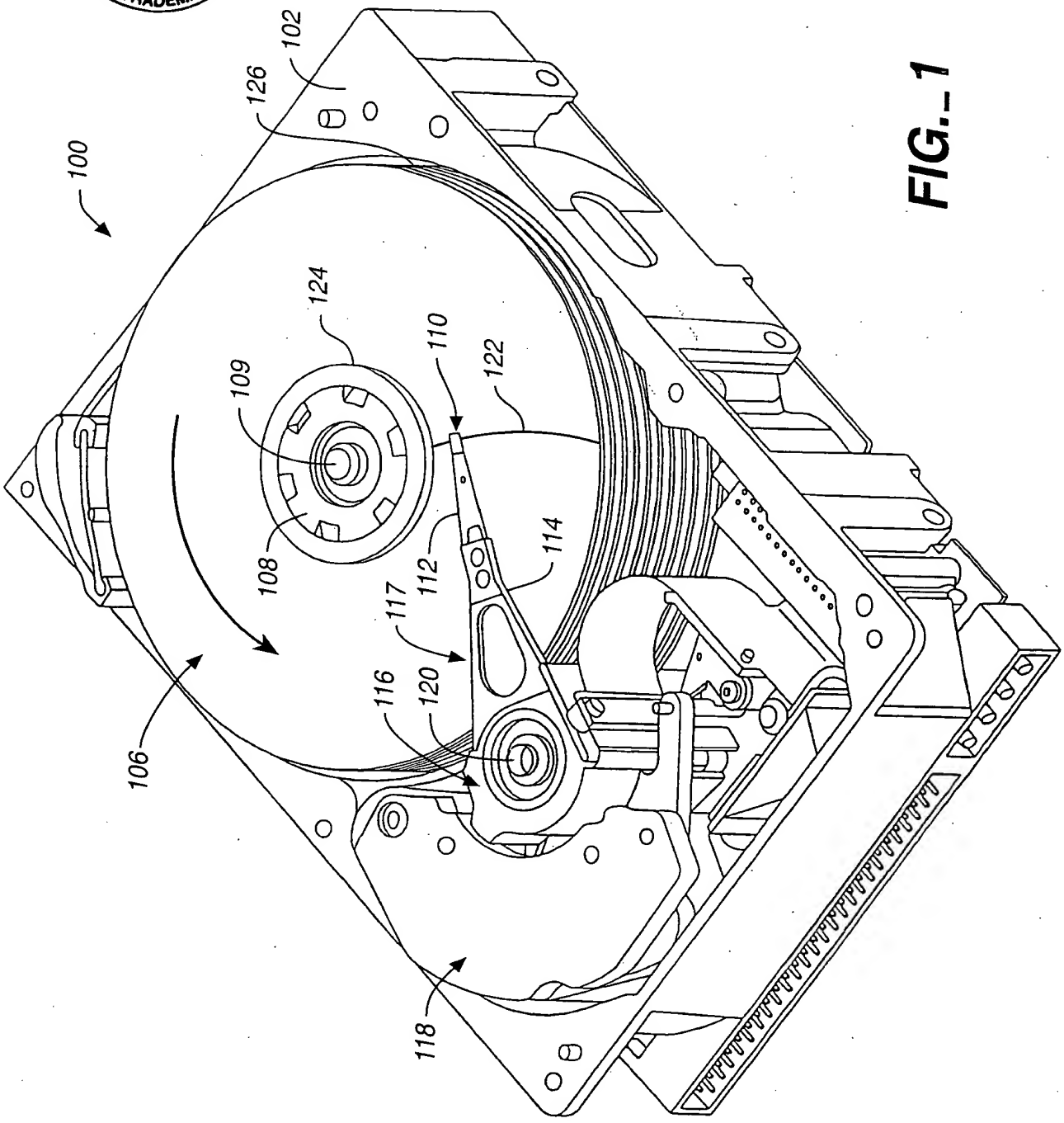


FIG._1

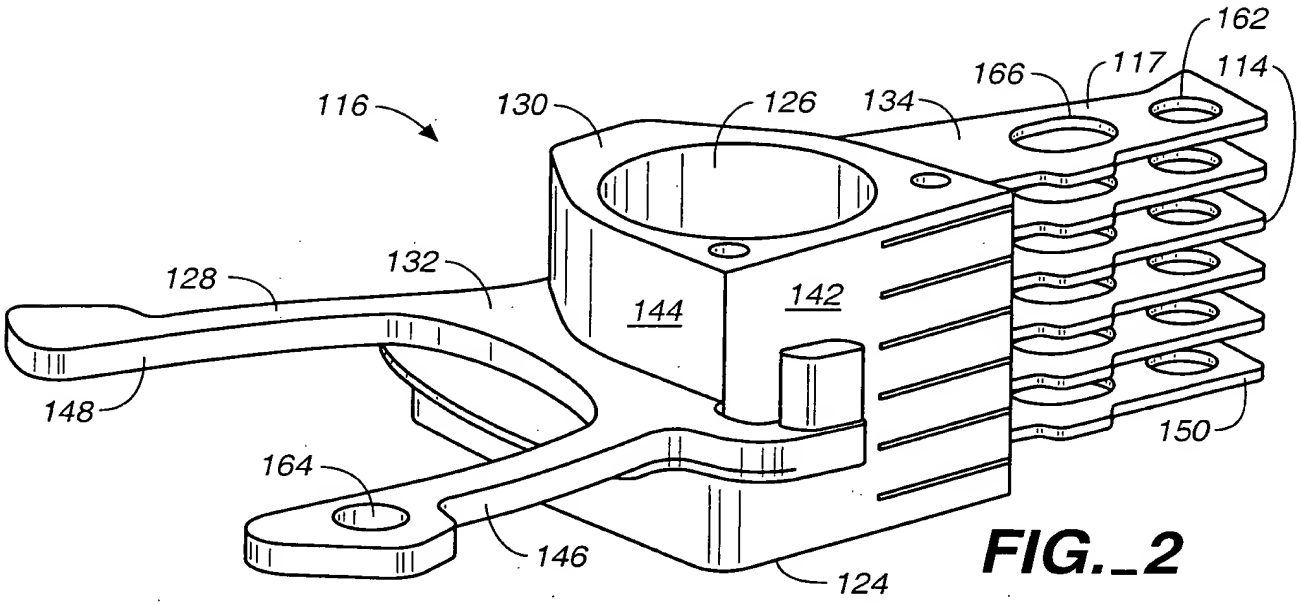
162
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FIG._2

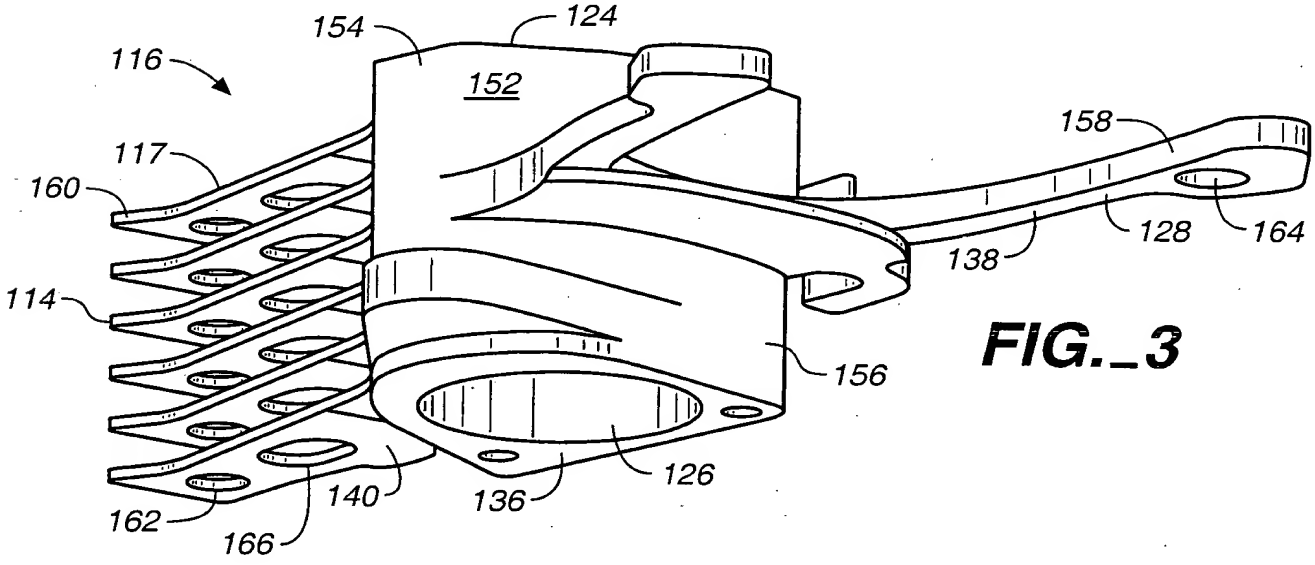
154
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FIG._3

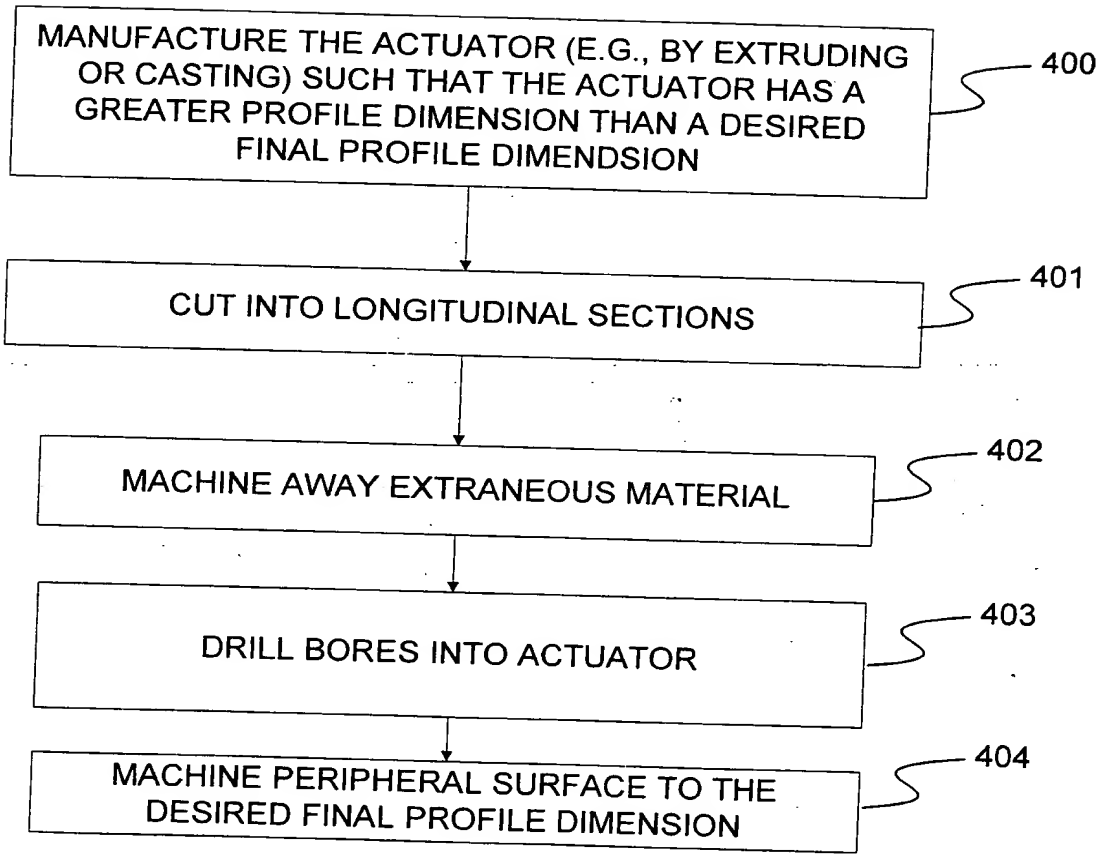
MANUFACTURE THE ACTUATOR (E.G., BY EXTRUDING OR CASTING) SUCH THAT THE ACTUATOR HAS A GREATER PROFILE DIMENSION THAN A DESIRED FINAL PROFILE DIMENDSION
400
CUT INTO LONGITUDINAL SECTIONS
401
MACHINE AWAY EXTRANEOUS MATERIAL
402
DRILL BORES INTO ACTUATOR
403
MACHINE PERIPHERAL SURFACE TO THE DESIRED FINAL PROFILE DIMENSION
404

FIG._4

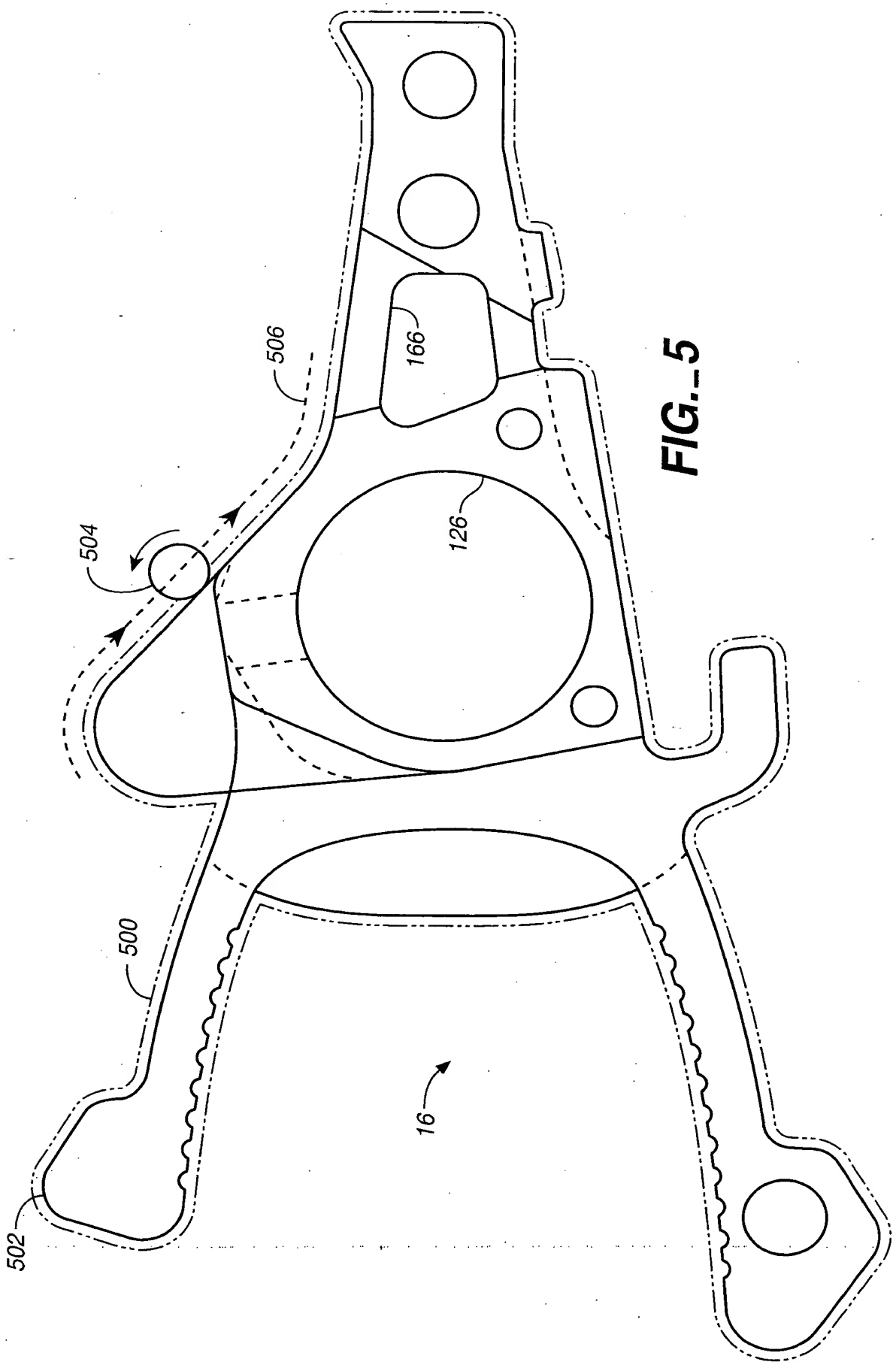


FIG._5

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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|---|---|---|
| First Named Inventor | : David D. Koester et al. | |
| Appln. No.: | 09/751,669 | |
| Filed | : December 29, 2000 | Group Art Unit: 2652 |
| For | : MACHINING ACTUATOR PERIPHERY TO REDUCE RESONANCE VARIATION | Examiner:Tianjie Chen |
| Docket No.: | S01.12-0697 | |

# DECLARATION OF DAVID D. KOESTER

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Commissioner for Patents
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I HEREBY CERTIFY THAT THIS PAPER IS BEING SENT BY U.S. MAIL, FIRST CLASS, TO THE COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450, THIS

24 DAY OF June, 2003.

Dan D. Bo
PATENT ATTORNEY

Sir:

1. I, David D. Koester, hereby declare as follows:

2. I am one of the inventors in the above-identified patent application.

3. I received a master's degree in mechanical engineering from the University of Minnesota, Minneapolis, MN.

4. I have been employed at Seagate Technology, LLC for 16 years as a mechanical engineer, and I am currently a mechanical engineering manager of a group responsible for the overall drive assembly of one of Seagate's products. This assembly includes an actuator.

5. Through my work at Seagate, I have become familiar with various mechanical surfaces and surface finishes, such as machined, cast and extruded surfaces.

6. A machined surface has a surface finish, which can clearly be identified by inspection of the surface and its properties. For example, a visual inspection would easily distinguish a cast or extruded surface from a machined surface.

7. A machined surface has a regular pattern of micro-grooves or scratches that are associated with the rotary or linear movement of the cutting features of the machining tool. A cast or extruded surface has a dull, smooth surface finish that is substantially devoid of similar patterns of micro-grooves or scratches.

8. The adjective "machined" in the phrase, "machined external peripheral surface" therefore refers to a definite structural element of the surface, which is easily identifiable by a person of ordinary skill in the art through inspection of the surface.

9. I declare that all statements made herein that are of my own knowledge are true and that all statements that are made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the above-application or any patent issued thereon.

David D. Koester

Date: 6-19-03